

REMARKS

Claims 11 and 14-17 are pending. Claims 1-10, 12 and 13 are cancelled without prejudice.

Claim 11 has been amended to be an independent claim. The amendment is supported by claim 9 and paragraph [0051] of US 2006-0251966, which corresponds to the present application.

Claims 14, 15 and 16 have been added, each depending on claim 11. Claims 14, 15 and 16 correspond to claims 2, 5 and 6, respectively.

Claim 17 has been added and depends from claim 15. Claim 17 finds support in paragraph [0038] of US 2006-0251966.

No new matter has been added by way of the above-amendment.

I. Prior Art Based Issues

The following prior art based rejections are pending:

- A) Claims 1, 2, 4, 6, 7 and 9-13 are rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Yamakawa et al., US 2002/0034686 (hereinafter “D1”); and
- B) Claims 5 and 8 under 35 U.S.C. § 103(a) as obvious over Yamakawa in view of Kasuke, JP08-107047 (hereinafter “D2”).

Applicants respectfully traverse both rejections.

I-a. Advantages of the Present Invention

The present invention is drawn to an electric double layer capacitor having an electrolyte and an electrode containing an electrode layer bounded onto a current collector;

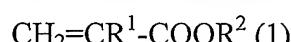
wherein the electrode layer comprises

a carbonaceous material and

a binder polymer which comprises:

50 to 98% by mole of monomer units (a) derived from a compound

represented by the following formula:



wherein R¹ represents a hydrogen atom or an alkyl group, and R² represents

an alkyl group having 2 to 18 carbon atoms or a cycloalkyl group having 3 to 18 carbon atoms,
1 to 30% by mole of monomer units (b) derived from an α , β -ethylenically unsaturated nitrile compound, and
0.1 to 10% by mole of monomer units (c) derived from a multifunctional ethylenically unsaturated carboxylic acid ester; and has a glass transition temperature from -80 to 0°C,
wherein the electrolyte includes
tetraethylammonium tetrafluoroborate, triethylmonomethylammonium tetrafluoroborate, or tetraethylammonium hexafluorophosphate.

The inventive electric double layer capacitor having the above-described features is electrochemically stable and has a high capacity resulting from the use of a binder having a good binding force and an excellent heat resistance.

I-b. Patentable distinctions between the present invention and the teachings of D1 and D2

Applicants respectfully submit that D1 (either taken alone or in combination with D2) does not teach or fairly suggest the combination of the specific electrolyte, the carbonaceous material and the binder, as presently claimed.

Upon careful review of the disclosure of D1, it is clear that the disclosure of D1 is drawn to lithium ion secondary batteries which require movement of the lithium ion in the capacitor. See [0004]. In fact, all of the electrolytes disclosed by D1 are lithium salts, see [0072]. In contrast, the electrolyte to be used in the capacitor of the present invention is defined in such a way as to not require movement of lithium ion, see [0051] of US 2006-0251966.

In general, the electrolyte, organic solvent and binder are chosen so that the electrolyte is soluble in the organic solvent and the binder for the electrode of the capacitor is essentially not soluble in the electrolyte solution (comprising the electrolyte and the organic solvent). As such, when

an electrolyte is selected (such as the selection of the ammonium electrolytes which are now recited in claim 11), the organic solvent is limited to one which dissolves the electrolyte. If a different electrolyte is selected, then a different organic solvent will likely need to be selected. Also, the binder used for the electrode of the capacitor is selected so as not to essentially dissolve in the electrolyte solution. As the different electrolyte solution is used, a different binder is chosen so as not to dissolve in the electrolyte solution. Thus, the binder for an electric double layer capacitor which uses the movement of lithium ions, such as in D1, cannot be necessarily used as the binder for an electric double layer capacitor which includes ammonium electrolytes and does not use the movement of lithium ions, as presently claimed.

Furthermore, D1 does not teach or suggest that the binder described in D1 may be applied to the capacitor which does not use the movement of lithium ion, as presently claimed.

In addition, D1 does not teach or suggest that the electrolyte includes tetraethylammonium tetrafluoroborate, triethylmonomethylammonium tetrafluoroborate, or tetraethylammonium hexafluorophosphate, as presently claimed.

The inventive electric double layer capacitor has the advantage of having a large initial discharge capacity, and only shows a small drop in capacity even if the capacitors are kept at high temperatures. This advantage is the result of the combination of the presently claimed specific electrolyte, the carbonaceous material and the binder. Neither the inventive combination, nor the advantages derived therefrom are taught or suggested by D1.

Lastly, the Examiner, aware of the deficiencies of D1 with respect to claims 5 and 8, cites to D2 to cure these deficiencies. However, Applicants respectfully submit that D2 does not cure the deficiencies of D1 with respect to claim 11, as currently amended. Also, D2 does not teach or suggest the binder of present invention. Therefore, the present invention is not anticipated by D1 and is not obvious over D1, either taken alone or in combination with D2.

Therefore, since the present invention in claim 11 is not anticipated by D1, nor is it obvious over D1 (either alone or in combination with D2), claims 14-17 depending on claim 11 are not anticipated by D1, nor are they obvious over D1 (either alone or in combination with D2). Reconsideration and withdrawal of the rejections are respectfully requested.

In view of the above amendment, applicant believes the pending application is in

condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq., Reg. No. 43,575, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By  #43575

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